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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte FREDERICK LOCKWOOD, JEAN-PIERRE TRANIER, and CLAIRE WEBER

Appeal 2015-003133
Application 13/133,852[1]
Technology Center 3700

Before THOMAS F. SMEGAL, LISA M. GUIJT, and BRENT M. DOUGAL, *Administrative Patent Judges*.

SMEGAL, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Frederick Lockwood et al. (Appellants) seek our review under 35 U.S.C. § 134 of the Examiner's final rejection under 35 U.S.C. § 103(a) of claims 11–13, 15–17, 19, and 20 as unpatentable over Saysset (US 2008/0302133 A1, pub. Dec. 11, 2008) and Victory (US 6,053,007, iss. Apr. 25, 2000); and claims 14 and 18 as unpatentable over Saysset, Victory, and Clodic (US 7,073,348 B2, iss. July 11, 2006). We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] According to Appellants, the real party in interest is L'Air Liquide Societe Anonyme pour l'Etude et l'Exploitation. Br. 3.

CLAIMED SUBJECT MATTER

Claims 11, the sole independent claim, is reproduced below and illustrates the claimed subject matter, with disputed limitations emphasized.

> Claim 11. A method for producing at least one CO2-lean gas and one or more CO2-rich primary fluids from a process fluid containing CO2 and at least one compound more volatile than CO2, comprising:
>
> a) a first cooling of said process fluid by exchange of heat with no change in state;
>
> b) a second cooling of at least part of said process fluid cooled in step a) so as to obtain at least one solid containing predominantly CO2 and at least said CO2-lean gas; and
>
> c) a step comprising liquefaction of at least part of said solid and making it possible to obtain said one or more CO2-rich primary fluids;
>
> *wherein at least part of said first cooling performed in step a) is obtained by heating up at least part of said one or more CO2-rich primary fluids.*

ANALYSIS

Obviousness of Claims 11–13, 15–17, 19, and 20 over Saysset and Victory; and of Claims 14 and 18 over Saysset, Victory, and Clodic

Appellants argue claims 11–20 as if all the claims were rejected as obvious over Saysset and Victory. *See* Br. 6–8. We select claim 11 as the representative claim for this group, and the remaining claims stand or fall with claim 11. *See* 37 C.F.R. 41.37(c)(1)(iv).

In determining claim 11 to be unpatentable over Saysset and Victory, the Examiner relies on Saysset for teaching a method for producing at least one CO2-lean gas and one CO2-rich primary fluid from a process fluid containing CO2 and at least one compound more volatile than CO2, where the method includes, *inter alia*, first, a step a) for cooling the process fluid

with no change in state, second, a step b) for further cooling the process fluid to produce at least one solid portion containing predominantly CO2 and at least one CO2-lean gas, and a step c) for producing liquefaction of a portion of the one solid portion that is then withdrawn as a CO2–rich primary fluid through pipe 144. *See* Final Act. 2 (citing Saysset ¶¶ 91, 93, 95, 96, 145; Fig. 1). However, the Examiner observes that "Saysset does not teach wherein at least part of said first cooling [of process fluid] performed in step a) is obtained by heating up at least part of [the] CO2-rich primary fluids. . . by exchange of heat with said process fluid." *Id.* at 3.

The Examiner finds that Victory teaches "a product stream of CO enriched fluid (Figure 2A, 115) [that] is warmed against the incoming feed stream via two heat exchangers (Figure 1, 133/134) so as to provide the necessary cooling [of the feed stream]." *Id.* (citing Victory, col. 7, ll. 18–22). Based on the foregoing, the Examiner determines that:

> it would have been obvious . . . to combine the invention of Saysset with that of Victory so that at least part of said first cooling performed in step a) is obtained by heating up at least part of said one or more CO2-rich primary fluids because it is known that the CO2 enriched fluid [can be used for] warming of the feed stream by exchange of heat . . . where additional refrigeration or reduced refrigeration can be provided as a means for compensating for [the temperature of] a varying inlet stream.

Id.

In the "Response to Arguments" portion of the Final Action, the Examiner also clarifies that

> Victory is only used for showing the obviousness of a stream of CO2 that is produced from solidifying and then melting the CO2 as a means of separation from a CO2 containing stream and then using it to pre-cool the initial feed stream, the method by which the CO2 is produced does not render this unobvious as the

> teaching only relates to using a melted CO2 stream to pre-cool a CO2 containing stream.

Id. at 8.

The Examiner also responds to Appellants' prior contention, from an amendment filed on May 20, 2013, that combining Victory with Saysset "would render the basic operation of Saysset unworkable," by reasoning that "all that is required for the application of Saysset is that the initial stream is cooled," because "Saysset uses multiple streams of cooling to pre-cool the feed stream and the use of the carbon dioxide stream produced in the pipe (Figure 1, 151) for [] this pre-cooling would not render the basic operation of Saysset unworkable." Final Act. 8.

In taking issue with the analysis and conclusions presented in the Final Action, Appellants contend that Saysset "teaches a fully integrated system, wherein all the cooling that is required, comes from vaporizing LNG and producing a product NG stream." Br. 6–7. However, Appellants misread Saysset which also discloses recycling a CO2-rich primary fluid for use in the second cooling step. *See* Saysset ¶¶ 20–25. Furthermore, the presence of additional structures in the prior art does not undermine a rejection where the claim uses "comprising." *See Exergen Corp. v. Wal-Mart Stores, Inc*., 575 F.3d 1312, 1319 (Fed. Cir. 2009) ("The claim uses the term 'comprising,' which is well understood in patent law to mean 'including but not limited to.'" (*quoting CIAS, Inc. v. Alliance Gaming Corp*., 504 F.3d 1356, 1360 (Fed. Cir. 2007)).

Appellants next contend that "[i]t is very clear, to one skilled in the art, that the system described in Saysset [] cannot be arbitrarily altered to reroute a liquid CO2 line," pointing to the disclosure in paragraphs 97 and 98 of Saysset as a basis for concluding that "simply re-routing liquid CO2

from one destination to another within the Saysset [] cycle would alter the basic functionality [of Saysset]," so that "adding Victory [] to Saysset [] would render the system inoperable." Br. 7. However, Appellants offer no explanation or evidence supporting the argument that re-routing a melted CO2 stream to pre-cool a CO2 containing stream would render Saysset inoperable, particularly where, as we pointed out *supra*, Saysset teaches recycling melted CO2 for that very purpose.

After first repeating Appellants' contention, the Examiner disagrees that "it would change the overall heat transfer available in the heat exchangers and would require redimensioning of the system for the differing heat exchange," reasoning that "liquid CO2 is recovered in Saysset for other uses" which "would include [re-routing liquid CO2 from one destination to another within the Saysset cycle]." Ans. 9–10. The Examiner reasons that "as noted by [Appellants, Saysset] has the ability to use additional cooling including that of a loop using ethylene or ethane," so that "[i]t would be obvious to replace that additional cooling loop . . . with using liquid CO2 for that." *Id.* Appellants have not apprised us of any error in the Examiner's findings or conclusions, and we find none.

Appellants' final contention is that "the entire point of Victory [] is to separate out CO2 from a CO2 containing stream under 'solids forming conditions"' but that "[s]tream 115, as identified by the examiner as having come from solid CO2 was, in fact, never solid and was produced and discharged as a liquid," so that "the stated purpose of this reference is moot." Br. 7. However, Appellants are simply attacking Victory in isolation for lacking support for findings not relied upon by the Examiner, rather than addressing the Examiner's combination of Saysset and Victory.

Nonobviousness cannot be established by attacking references individually when the rejection is predicated upon a combination of prior art disclosures. *See In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986).

While agreeing that "Victory does not teach solidifying and melting the CO2 in its apparatus," the Examiner explains that "Victory still does teach the utilization of a produced liquid stream of carbon dioxide used [for] cooling." Ans. 10. Furthermore, as has been explained *supra,* the Examiner relies upon Saysset for teaching cooling a process fluid to produce at least one solid portion containing predominantly CO2 and at least one CO2-lean gas, and then liquefying a portion of the solid portion to be withdrawn as a CO2-rich primary fluid through pipe 144. *See* Final Act. 2. As has also been explained *supra*, Victory is relied upon merely to teach recycle of liquid CO2 to the initial cooling step. Again, Appellants have not apprised us of any error in the Examiner's findings or conclusions, and we find none.

For the foregoing reasons, we sustain the Examiner's unpatentability rejection of claims 11–13, 15–17, 19, and 20 over Saysset and Victory, and of claims 14 and 18 over Saysset, Victory, and Clodic.

DECISION

We AFFIRM the Examiner's rejections.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED